

## XXIII.—Notice of some Genera of Cyclopæcea. By J. D. DANA.

As a preface to the descriptions which follow, a classification of Crustacea is here given; it is made out so as to exhibit to some extent the parallel relations of the several orders and subdivisions.

## CRUSTACEA.

Subclassis I. <b>PODOPHTHALMIA.</b> Ordo 1. DECAPODA. Tribus 1. Brachyura. 2. Anomoura. 3. Macroura.	Subclassis II. <b>EDRIOPHTHALMIA.</b> Ordo 1. CHORISTOPODA *. Tribus 1. Isopoda. 2. Læmipoda. 3. Amphipoda.	Subclassis III. <b>MANDYATA</b> †.	
Ordo 2. SCHIZOPODA.	Ordo 2. ENTOMOSTRACA.		Tribus 1. Cirripeda, or Balanacea ‡.
Tribus 1. Stomapoda. 2. Diploöpada.	Subord. 1. <b>GNATHOSTOMATA</b> †. Tribus 1. Branchipodææ. 2. Limnadiææ. 3. Daphniææ. 4. Cyclopææ. 5. Cypridææ.	Subord. 2. <b>CORMOSTOMATA</b> ‡. Tribus 1. Caligææ. 2. Lerneæææ. 3. Nymphonæææ.	Subord. 3. <b>MEROSTOMATA</b> §. Tribus 1. Limulæææ.
	Ordo 3. TRILOBITA.		

## Order ENTOMOSTRACA.

## Tribe CYCLOPÆCEA.

To avoid explanations in the following descriptions, we here enumerate the prominent external characters of this tribe.

*Body* jointed, the carapax not prolonged beyond the joint to which it belongs; *abdomen* not inflexed.

\* From *χωριστός*, *separate*, and *πούς*, *foot*, alluding to the fact that the pairs of feet belong each to a distinct segment of the body.

† From *γνάθος*, *jaw*, and *στόμα*, *mouth*, alluding to the mouth being furnished with proper mandibles and maxillæ.

‡ From *κορμός*, *trunk*, and *στόμα*, *mouth*, the mouth having the form of a moveable trunk.

§ From *μηρός*, *thigh*, and *στόμα*, *mouth*, the basal joints of the legs constituting the jaws.

|| From *μανδύη*, *a cloak*, alluding to the covering in which the body of the animal is inclosed.

¶ The Cypris-like young of several *Anatifæ* were collected and figured by the writer, and the metamorphosis traced to the adult state. When first found swimming free in the ocean, they were taken for a new genus allied to *Cypris*, so similar are their forms. The fact that the body and legs of the Cirripeda shed their skin, is further evidence of the propriety of placing this group with Crustacea.

The pedicel of the *Anatifæ* corresponds to a pair of antennæ in the young; the animal attaches itself by the sucker-like disc terminating these organs before the metamorphosis commences, and in a group of *Anatifæ* all the different stages may be observed, from the pair of distinct antennæ to the fixed simple pedicel.

*Eyes* simple.

*Antennæ*, two pairs; the second often pediform or subcheliform.

*Mandibles* 4—5-spino-dentate, sometimes having a subnatatory palpus.

*Maxillæ*, one pair; sometimes with a subnatatory palpus.

*Maxillipeds*, one pair; sometimes simple maxillæ; at others prehensile, but never at all natatory.

*Feet*, six pairs; the *first* often prehensile and subcheliform, and either straight or geniculated; *next four* pairs bifid and natatory; the *sixth* or *posterior* (corresponding to another pair of natatories) rudimentary or obsolete, but in some genera large in the male, with the right one subcheliform.

*Abdomen* 2- to 6-jointed; two caudal appendages furnished with five setæ, some of which may be obsolete; occasionally short appendages to one or both of the first and second joints.

*External ovaries*, one or two, proceeding from the *second* joint of the abdomen, or what corresponds thereto.

The genera of this tribe here described may be distributed as follows:—

1. *Palpi of the mandibles and maxillæ obsolete or wanting; eyes with simple spherical lenses.*

Family 1. CYCLOPIDÆ. External ovaries two. Eyes two, on a single spot of pigment. Abdomen abruptly narrower than the cephalothorax.

Genus 1. CYCLOPS, Müller. The two anterior antennæ subcheliform in the male. [Freshwater species.]

Family 2. ARPACTIDÆ. External ovary single. Eyes two, on a single spot of pigment. A short appendage near middle of anterior antennæ. Abdomen seldom abruptly narrower than the cephalothorax. [Marine species.]

Genus 1. ARPACTUS\*, Milne Edwards. Anterior antennæ short, and both, in the male, subcheliform; posterior pair terminating in a number of moveable setæ. Prehensile feet subcheliform.

Genus 2. SETELLA, Dana. Anterior antennæ moderately long, slender, and not subcheliform in the male; posterior pair and prehensile feet nearly as in *Arpactus*; short appendages to the first two joints of abdomen; body slender, and two caudal setæ much longer than the body. [Two moveable appendages under the beak.]

\* Milne Edwards has instituted the genus *Cyclopsina* for a group near *Arpactus* having the posterior maxillipeds not subcheliform. In the species examined by the writer the subcheliform character is constant, but the moveable finger is sometimes reduced to a very short hook.

The name *Setella* alludes to the *seta*-like form of the animal, and is from *seta*, a bristle.

2. *Palpi of the mandibles and of the maxilla prominent and subnatatory.*

Family 3. CALANIDÆ. External ovary single. Eyes two, the spherical lenses on the same or separate spots of pigment. Anterior antennæ very long and slender, without an appendage. Abdomen abruptly narrower than the cephalothorax. [Marine species.]

*a. Posterior thoracic legs rudimentary or obsolete, without appendages. Anterior antennæ alike in the two sexes, and never with a geniculating joint.*

Genus 1. CALANUS, *Leach*. Cephalothorax 4-jointed. Anterior antennæ multiarticulate, with the front margin neatly setiferous, and also the posterior apices of the three terminal joints; first pair of feet much larger than the maxillipeds, having outward lateral motion, but scarcely prehensile; maxillipeds very short and straight, setigerous; abdomen short, 2- to 4-jointed. Beak furcate.

Genus 2. SCRIBELLA, *Dana*. Cephalothorax 4-jointed. Anterior antennæ long, 7-jointed; setæ long and pointing in different directions. Maxillipeds much larger than the first pair of legs, flexed forward, the three terminal joints as long as the basal and setigerous, the setæ setulose. Abdomen very long (as long as the cephalothorax); two setæ to the short basal joint (a plume or capillary appendage to the base of the eight natatory legs extending outward at right angles with the body).

Genus 3. ACARTIA, *Dana*. Anterior antennæ few-jointed; setæ long and pointed in different directions; maxillipeds much larger than the first pair of legs, not flexed, having the terminal joints very short and setigerous, nearly as in the genus *Pontella*; the first pair of legs small and short, not prehensile; the posterior thoracic legs, a single small joint bearing two divergent setæ, one quite long and usually standing out from the body.

The name *Acartia* is from ἀκαρτος, *unshorn*, alluding to the long divaricate hairs of the antennæ.

*b. Posterior thoracic legs very long and nearly equal; antennæ of the two sexes alike, without a geniculating joint.*

Genus 4. EUCHIRUS, *Dana*. Anterior antennæ many-jointed, with several long setæ at intervals; first pair of feet much larger than the maxillipeds, very long and doubly geniculate, the apex flexed downward and furnished below with a pencil of naked setæ; motion of these organs forward in the line of the body, and not

outward. Posterior thoracic legs in male very long, and the right one subcheliform. Beak pointed, in lateral view emarginate.

*c. Posterior thoracic legs in the male large, the two unequal, and the right subcheliform; the right one of the anterior antennæ in the same sex having a geniculating joint about one-third its length from the apex.*

Genus 5. PONTELLA\*. Anterior antennæ multiarticulate, the setæ as in *Calanus*. Maxillipeds much larger than the first pair of legs, not flexed, and having the terminal joints short and setigerous, the setæ extending forward to the mouth and setulose, as in *Acartia*; the first pair of legs small and short, not prehensile. The right posterior thoracic leg in the male large cheliform, the left smaller and often simple. Beak furcate. Caudal setæ more or less spread. [There is a large glassy appendage under the head, with a rounded or reniform summit.]

Genus 6. CANDACIA, Dana. Anterior antennæ and posterior thoracic legs nearly as in *Pontella*; the first pair of legs much larger than the maxillipeds, elongate and flexed forward, with the extremity inflexed and bearing a pencil of long naked setæ, motion in the line of the body. Front truncate; caudal setæ usually not spread. Colour often in part black or nearly so.

3. *Palpi of the mandibles and maxillæ obsolete; two simple eyes?; also two oblate lenses in the front, and two prolate lenses posterior to these within, which may constitute another pair of eyes.*

Family 4. CORYCÆIDÆ. Tentacles short, few-jointed; external ovaries two.

Genus 1. CORYCÆUS†, Dana. Body not depressed. Abdomen abruptly narrower than the body, 2- or 3-jointed; second pair of antennæ subcheliform, larger than the first pair of legs (nearly as in the genus *Ergasilus*).

Genus 2. ANTARIA, Dana. Similar to *Corycæus*, but having the second pair of antennæ terminating in a few moveable setæ,

\* The name *Pontia*, applied to this group by Milne Edwards, was previously applied to a genus of insects, and has therefore been changed as above. The genus *Cetochilus* of Roussel de Vauzème does not differ essentially from *Pontella*.

† See Proceed. of Acad. Nat. Sci. of Philad. for October 1845, p. 285. The two lenses in these animals are separated by an unobstructed space, and appear beyond doubt to serve for the transmission of light. In contact with the posterior lens behind is an oblong spot of dark pigment. The only other supposition with regard to their nature which I can suggest, is their possible connection with phosphorescence. But such an arrangement for this end is not probable; and moreover I was never satisfied that the species were phosphorescent.

and smaller than the first pair of legs. [I am not satisfied that these specimens are not the female of the *Corycæi*.]

Genus 3. SAPPHIRINA, *Thompson*. Body much-depressed; antennæ as in *Corycæus*; abdomen 5- or 6-jointed, the basal joint in the female abruptly narrower than the thorax, and having a pair of short appendages; external ovaries two.

Family 5. MIRACIDÆ. Antennæ as in *Setella*; external ovary single.

Genus 1. MIRACIA, *Dana*. Body not depressed, nearly as in the *Arpactidæ*; the abdomen 5- or 6-jointed and not abruptly narrower than the thorax; anterior antennæ nearly as in *Setella*, with a short appendage near the middle; second pair of antennæ terminating in a few moveable setæ; beak with two cultriform appendages; first pair of legs subcheliform.

The distinctions in the above genera rest to a considerable extent upon the use of different organs for grasping in the union of the sexes. In *Cyclops* and *Arpactus*, both anterior antennæ of the male are subcheliform for this purpose; in *Pontella* and *Candacia* the right antenna and right posterior thoracic leg are thus modified in the male; in *Euchirus* both posterior thoracic legs are very much elongated; in *Calanus* the first pair of legs are long, and have an outward lateral motion for the purpose; in *Corycæus* the second pair of antennæ subserve this end, and in *Antaria* the first pair of legs are large and subcheliform; in *Setella* the same end appears to be secured by the first pair of natatories.

The genera of *Calanidæ* differ also in the relative development of the maxillipeds and first pair of legs. In *Pontella*, *Acartia* and *Scribella* the maxillipeds are largest. In *Pontella* and *Acartia* they are straight, with long setulose setæ directed forward so as to form a kind of scoop-net. In *Scribella* they are flexed like the letter L. In *Calanus*, *Euchirus* and *Candacia* the first pair of legs are larger than the maxillipeds; in *Calanus* they are long and spread outward laterally; in *Euchirus* they are thrown forward in the line of the body, and are flexed like the letter  $\surd$ ; and in *Candacia* they have nearly a similar position, but have the extremity flexed towards the head instead of away from it.

The maxillipeds may always be distinguished from the first pair of legs by the setæ, which are setulose in the former and naked in the latter\*.

\* This article, for the communication of which we are indebted to the author, has also been published in *Silliman's American Journal* for March 1846.—ED.